ARTICLE X.

HISTORY OF A CASE OF TWICE-PERFORMED CÆSAREAN SECTION, UNDER THE LATE PROF. WILLIAM GIBSON; WITH AN AUTOPSY OF THE PATIENT MADE FIFTY YEARS AFTER THE FIRST OPERATION, BY DRS. CALEB W. HORNOR and ROBERT P. HARRIS, of Philadelphia. Reported by ROBERT P. HARRIS, M.D.

IN August, 1835, there appeared in this JOURNAL a report by the late Dr. Joseph G. Nancrede, of a Cæsarean operation performed with success to mother and child, on March 25th of that year, by Prof. Gibson, of the Chair of Surgery in the University of Pennsylvania. As this was the first operation of the kind in Philadelphia, its successful termination made the case the town-talk among physicians, and very naturally also among the matrons of the city, which then contained less than one-fourth of its present population.

Again, in this JOURNAL for May, 1838, there appeared a second report of a similar character, written by the late Dr. George Fox, concerning the same operator, and the same patient, showing that she had been again delivered with full success under the knife, on November 5, 1837. These two operations saved a daughter and son, who were, in their early childhood, shown annually to the medical class of students in the University of Pennsylvania by the late Prof. Hugh L. Hodge, when he lectured upon "Gastro-Hysterotomy;" and many now living will remember the mother and her attractive little ones, and how they estimated her bravery in submitting (for there were no anæsthetics in those days) to this painful operation for the saving of her children. Not only did these children live to maturity, but the first is still living, the son having died of consumption on October 4, 1881, when nearly 44 years old.

The patient, Mrs. Reybold, died on August 15th, 1885, aged 76 years and five months. She had been declining in strength for a few years, and died from the failure of her digestive functions, her mind being clear until the last. She has thus outlived the nine physicians who were present at her first operation, and the four who, with the two Gibsons, made up the corps at the second, all of whom, with the exception of the operator, graduated in the University of Pennsylvania from 1806 to 1836. Among those present we will mention Prof. William P. Dewees, Prof. William E. Hornor, Prof. Charles D. Meigs, Prof. Hugh L. Hodge, Dr. George W. Norris, and Dr. John Dove, of Richmond, Virginia.

Mary H. was born in Ireland on March 15, 1809; came to America in early childhood, and became Mrs. Reybold on May 16, 1830, at the age of 21; and a patient of Dr. George Fox in June, 1831, when fully matured in pregnancy. It was then discovered that her skeleton bore unmistakable marks of rachitic disease, and that her pelvis had been much deformed thereby. This was attributed to a fall in her second year, after which she was not able to walk for two years or more, but finally regained her health. Finding the difficulty in her case, Dr. Fox called to his aid Prof. James, Dr. Thomas T. Hewson, Dr. J. Rhea Barton, Dr. Chas. D. Meigs, and Dr. Lukens. The consultants decided "that the antero-posterior diameter" of the superior strait "was certainly not more than two inches, and *probably not more than one and three-quarters.*" The Cæsarean operation was proposed, but was decidedly opposed by "some of the most distinguished surgeons" present, under a conviction that it would be almost necessarily fatal to the mother. After a labor of sixty-four hours, and the fœtus being already dead, Dr. Meigs perforated its head, but was not able to deliver it with any of the appliances then in use. He was forced to delay until putrefaction had softened the fœtus before he could remove it, which was not until thirty-three hours later. By this time Mrs. R. was much exhausted and narrowly escaped death. It was the opinion of those present during the delivery, that the Cæsarean operation would have been better and attended with no more if as much risk. Dr. Fox was called to the labor on June 14th, and it was not completed until the night of June 17–18th. At the next morning visit her pulse was 112, and the following, 94. After this she made a good recovery.

Before her next labor, Dr. Meigs had invented his "embryulcia forceps," and as she would not consent to the bringing on of premature labor, or submit to the Cæsarean operation, he was forced to destroy the fœtus, and reduce the size of its head, which the instruments enabled him to do so readily that delivery was accomplished in two hours. This took place on June 23, 1833, and the delivery was commenced early, as Drs. Fox and Meigs believed that upon the previous occasion Mrs. R. had narrowly escaped death by exhaustion. Dr. Fox was again the accoucheur, and Dr. Meigs the consultant in the case. The illustration in Prof. Meigs's work upon Midwifery, in which he shows the use of his bent forceps in this case, is incorrect as to the direction of the spine and sacrum, as will be shown hereafter. He has made the pelvic collapse anterior, when it was posterior, at the sacro-vertebral angle, of which he was perfectly aware, as he says she had a deep hollow at the base of the sacrum. Dr. Meigs told Mrs. R. that he would not destroy another child for her in the event of her becoming pregnant, and that she would have to submit to the Cæsarean section.

In September, 1834, when three months pregnant, Mrs. R. placed herself under the care of the late Dr. Joseph G. Nancrede, who called in the counsel of the late Dr. Francis S. Beattie, and it was finally determined to deliver by the Cæsarean section, under Dr. Gibson, who, with several others, was consulted about the case. When in labor, on March 25, 1835, it required two hours' waiting and urging, with the aid of her father confessor, before she would consent to submit to the operation. Dr. Gibson and party were then called up, and the operation performed after a labor of twelve hours. With regard to this operation, we have only to say that the abdominal incision was six inches long, that the membranes were unruptured, and that the fœtus presented by the breech. The waters were discharged through the wound, and the uterus was allowed to depend for safety upon its own contractions. The operation lasted about ten minutes, and the patient's pulse was 80 after a short rest.

On the 29th there were evidences of a moderate peritonitis; pulse 110; no tympanites, but tenderness on pressure low down in the abdomen, and pains in the iliac regions. This pulse of 112 continued for four days, during which time she was bled f℥viij on two occasions, and forty leeches were applied (probably American, counting f℥j to six or eight); she was likewise purged on the 31st. Her pulse now very gradually fell to 84, which it reached at the end of the third week; she sat up in twenty-eight days, a small sinus still remaining in the abdominal wound, which was perfectly cicatrized by June 1st. These points have an important connection with what we found on autopsy.

During the fourth pregnancy of Mrs. R. the services of Dr. Fox were again called in requisition, it being understood that she would submit to a second Cæsarean operation if required, and she was placed upon a milk and farinaceous diet in preparation. When summoned to attend her in labor, she was found excited, with a pulse of 116, and not in as favorable a condition as upon the preceding occasion. Her abdomen showed a cicatrix of five inches in length, which was hard, dark-colored, and puckered; the uterus was anteverted, and "adhesion had apparently united the integuments and uterus for a space of four or five inches from near the pubes up towards the umbilicus." The child was ascertained by the ear to be alive. The section was made on November 5, 1837.

Prof. Gibson was again the operator, and was assisted by Drs. Fox, Norris, and Meigs. He cut directly in the line of the old cicatrix, "from an inch and a half below the umbilicus nearly down to the pubes." "The uterus was found connected with the integuments by strong adhesions, for a space of about four inches; the incision into this organ was made near the fundus, and extended down five or six inches; that portion that was adherent was much attenuated, being scarcely one-fourth of an inch in thickness." The operator dissected up the adhesions until a knuckle of intestine protruded, when he computed the union at half an inch in width. The placenta was immediately under the line of incision, and the delivery gave rise at first to considerable hemorrhage. The boy extracted was of full size, but very feeble, and his respiration was for some time quite imperfect. The abdominal wound was closed by six sutures, adhesive strips, a compress and binder. Time in labor 10 hours; pulse before operation 112, and immediately afterward 96.

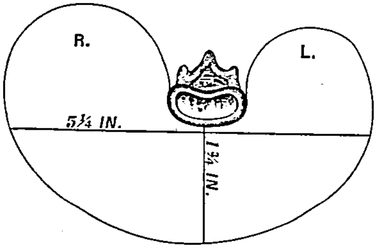
Mrs. R. made a good recovery after the second operation, and had a pulse of 84 in twelve days; there were no symptoms of peritonitis. She was able to nurse her infant, and sat up in twenty days; the wound entirely closed by February 10, 1838, there having remained a fistula, as after the former operation.

The reporter became acquainted with Mrs. Reybold on April 1, 1878, and believing that all who had written about her were in error as to her height, had her carefully measured by her physician, the late Dr. William F. Patterson, who ascertained that she was not 4 ft. 6, but 4 ft. 8 inches in height. She said that the second operation through the old scar was particularly severe, that this spot was always sensitive, and that she felt a drawing sensation in it. She was unusually straight in her dorsal spine and neck; sat very erect without support, and bore no evidence of any deformity when dressed; she walked slowly, and did not lift her feet well. When Dr. Fox was asked to attend her in her first labor she was 22 years old, and he a graduate of three years' standing; he had no suspicion of her conformation until he saw her actually in labor some weeks later. She promised on one occasion to leave him her pelvis, but being her senior he did not live to get it. He died on Dec. 27, 1882, aged 76, and, if we are not in error, was the last survivor of the thirteen doctors who were present at the first and second operations collectively. Little did the nine physicians and surgeons at the first operation dream of the possibility of the small patient under the knife outliving them all. She was always under the opinion that Dr. Nancrede starved her, which he was forced to do; and was particularly grateful to Dr. Fox, who from her condition was able to feed her more generously after the second operation.

Autopsy.—Several years ago Mrs. R., by removing to the mansion of her daughter, came directly under the care of Dr. Hornor, and we agreed, in the event of her death in our time, to ask for and make an autopsy with special reference to her pelvic deformity and the attachment of the uterus. In a few hours after her death, two days ago, Dr. Hornor was kind enough to call upon me, and the remains being brought to the city we proceded to the examination in the evening, ten hours after her death. We found in the humeri femora and tibiæ very decided evidences of rickets; the arms being partly bent, the ossa femora curved antero-laterally, and the tibiæ flattened and curved forward. The upper parts of the thighs were very prominent at the sides of the pelvis, and the sacrum made quite an angle with the lumbar vertebræ, which were marked by a deep depression. There was no unusual prominence in the mons veneris, which was long, wide, and adipose. The abdomen was full and prominent from flatulent distension of the small and large intestines; the cicatrix made by the operations was well marked, but was not puckered or drawn in as if under any tension from within. We opened the abdomen by an inverted ⊥ incision, carrying the vertical cut to the left of the umbilicus and to the ribs, so as to avoid the cicatrix and any uterine adhesion that might exist. We found very decided evidences of the attack of peritonitis that followed the first operation, in the form of strong bands uniting the omentum to the abdominal wall, and the latter to the large intestine, one fan-like attachment to the angle formed by the ascending and transverse colon being particularly conspicuous. We also noticed the evidence that the incision had been carried to within half an inch of the pubes, in the formation of a dense cicatricial band in the seat of the linea alba, which was covered by skin showing but little evidence of having been incised. Four of the cicatrices made by the sutures were very conspicuous, being long and depressed; three inches apart in vertical measurement, and four and a half inches across the abdomen. Under the upper part of the abdominal cicatrix was a long band of tissue of a pale red color, having an intimate attachment to the same for about two inches in length, and extending on either side for about one inch in entire width. This band was entirely free below and passed down into the pelvis. It was soft, flat, smooth, and very much of the form of the tongue of a small dog. Upon carefully tracing this we found it to be the fundus uteri elongated to 4½ inches. The ovary on either side was at the brim of the pelvis, and these organs were small, dense, white, long-oviform, and about the size of a large pea-nut kernel. The upper part of the vagina and the cervix, after a half century of tension, felt like a hard cord of the size of the index finger. Union must have taken place from adhesive peritonitis between the fundus uteri and the upper part of the abdominal wound, soon after the completion of the first operation, before the uterus had fairly advanced in involution, and have become so dense in character by the subsequent attack as to prevent the organ from ever regaining its normal size and form, although it did not prevent a second impregnation. As Mrs.

R. ceased to bear children at the age of 28, although she menstruated, it is possible that this strain upon the uterus may have had something to do with her remaining unimpregnated.

The deformity of the pelvis was very much such as we expected to find it, except that the true conjugate was the smaller of the two measures given at the first consultation called by Dr. Fox in 1831, viz., 1¾ inches. The sacro-vertebral angle was very prominent, and the curve made by the two pubic bones in the linea-ileo-pectinea wider than normal. The pelvic brim in front was represented by a wide arch, and the whole edge of the brim of the true pelvis was very smooth and round without any inequalities. The transverse diameter carefully taken measured 5¼ inches. A measure carried in perpendicularly so as to avoid the promontory of the sacrum showed that this bone had a very deep concavity, which must have favored the use of instruments and the hand in extraction. My hand with the thumb and fingers extended and drawn together could be passed downward through the superior strait on the right side of the sacral projection but not on the left, which was of the same form but decidedly more contracted. This difference of development somewhat affected the whole of the left lower extremity, which was weaker and rather more ill-shapen than the right. The first fœtus of all, which was removed after putrefactive softening, was probably extracted through the right passage, although on the other side there was as much space as existed in some well-known cases where the same measure was adopted, as for example that of Elizabeth Sherwood, delivered by Dr. William Osborn, of England, after a labor of 72 hours, requiring 3 hours' traction; the woman recovered.



The superior strait of Mrs. Reybold's pelvis marks it as one of the "*reniform*" variety, but it differs from many of this type in the fact that the sacral indentation is much more decided, the circumference of the brim longer, and the side passages more round and larger. To deliver a fœtus through such a pelvis in two hours, more than half a century ago, was a decided feat on the part of Prof. Meigs, and it is equally creditable to him that he refused to repeat the operation; for the next presentation proving to be one of the breech, the destruction and decapitation of the fœtus would probably have been fatal to the mother before the head could have been extracted. Who that has seen this woman with her grandchildren and great-grandchildren could have condemned Dr. Meigs and those associated with him when they decided against craniotomy and in favor of gastro-hysterotomy?

The case of Mrs. Reybold is not simply a curiosity of surgical experience. That she twice recovered is not so remarkable, when we consider that five other women in the United States have done the same thing, and that one of these has now a daughter and son, living with her in Toledo, Ohio, all three being in good health, and with quite as fair a prospect of long life as she had. This Toledo mother is 39 years old, her daughter 10, and son 5 years. The danger in these cases is mainly after the first operation, except in those where the mother has fallen into bad health, as occurred in two instances in the United States. A third woman died after a third operation, from the same cause. The lesson to be learned from these recoveries under the first operation, and from others that have been operated upon once only, and with full success, is that it is all-important to give relief to the patient as early as possible. Mrs. R., by reason of her own opposition, lost more than two precious hours before the first operation, and made a very narrow escape from death by peritonitis. She was exceedingly fortunate in being under the care of Dr. Nancrede, who had had an experience of twenty-two years, lived in the heart of the city, and was a leading accoucheur. It was through his determination, after a careful investigation of the subject, and Dr. Gibson's willingness to operate, that the work was finally done. The celebrated surgeon, Philip S. Physick, had been offered the honor in a former pregnancy, but declined, fearing a fatal result. Dr. George Fox would have operated on the second occasion, but being still young in the profession, feared the expression of public opinion, in the event of a failure to save the patient, after the former success under another. This I was told by his nephew more than forty years ago.

In looking over the eight cases upon which the Cæsarean operation was performed twice, and in one instance three times, I find that promptness in action was a noted feature in the cases where the fœtus was saved. Thus the two Scudday operations were after 12 hours, and "a few hours." The Mills operation on a dwarf of 3 feet 9 was after a labor of only 4½ hours; the Newton case after 6 or 8 hours, and the Toledo operations after 7 hours and 3 hours respectively. The Merinar second operation was also "early;" the baby perished in the first labor. Had the first Gibson operation been several hours earlier, the patient might have made a much more rapid recovery. The Toledo operations were the only ones of the seventeen in which the uterine wound was sutured, the other fifteen dating prior to 1867, when this manner of treatment was revived with success in New Haven by Dr. T. Beers Townsend, and in New Orleans under Drs. D'Aquin and Brickell.

subject which has been too much neglected. It is true, that attention has been of late paid to the study of a series of affections which too often terminate in carcinoma linguæ, but these contributions are widely scattered throughout periodical literature, and nowhere heretofore could the student obtain the requisite information in a compact form. We do not say that most of the facts contained in this manual are not attainable, but no one, after glancing over the dozen pages of the mere bibliography of diseases of the tongue, will doubt that few would be equal to the task. This latter feature of the work is a most useful addendum.

Mr. Butlin, in his preface, unconsciously gives us one of the best guarantees possible that his work will be of value, when he says, that he has used his opportunities for years past in the out-patient practice of St. Bartholomew's in collecting notes and drawings of diseases of the tongue, "at first" without "any definite intention of publishing them, and certainly not with any intention of writing a book on *Diseases of the Tongue.*" In other words, cases were noted and opinions formed from experience with no view of making them fit into new, preconceived, or extended theories calculated to form the foundation of a special treatise. Nearly all the admirable chromo-lithographs which really *illustrate* this book are of cases which have been under the author's own care, a few only being taken from patients in the service of his colleagues. The author is to be congratulated upon the liberality of the publishers in allowing his drawings to be most artistically reproduced; we have rarely seen better ones.

In an introductory chapter Mr. Butlin rather unnecessarily explains at length his reasons for adopting the arrangement of his subject matter, which is partly encyclopædic, partly dictated by convenience. Burns, scalds, stings, bites, wounds, and foreign bodies in the tongue, are considered in the second chapter. A concise account is given of the effects produced upon the tongue by the various corrosive poisons, which is supplemented by a table at the end of Chapter IV. on "tinctorial discolorations and stains from caustics," which is a modification of that of Rigal. In all hemorrhages, other than those due to the presence of foreign bodies, the flow should be arrested *thoroughly* and as soon as possible. When the wound is far forward, this arrest should not be difficult, but Mr. Butlin advises that anæsthesia and a gag be used, and full control be obtained of the tongue by two threads passed through either side of its tip; meanwhile the pressure of a pad of lint and the finger will temporarily suffice. If the bleeding be capillary or venous, coaptation by deep-sutures after the removal of all clots will suffice; if arterial, the vessel must be sought for and secured, the wound being unhesitatingly enlarged if necessary. In doing this, it must be remembered that if the bleeding be arterial the wound must be a deep one and the incisions accordingly profound. If these rather elaborate measures cannot be adopted owing to lack of assistance, digital pressure on a small piece of lint lodged in the deepest part of the wound must be resorted to, until proper assistance is attainable. Ligature of the lingual artery for primary hemorrhage is probably never demanded. Secondary hemorrhage must be treated on the same lines, but failure to secure the vessel in the wound may necessitate ligature of the lingual or even the external or common carotid; the latter, when the wound involves the tonsil or adjacent structures.

Sutures, other than for the arrest of capillary or venous hemorrhage, are only required when the parts do not lie naturally in apposition, or where acute inflammation of the attic in early life. Troeltsch, who observed these sinuses twenty-five years ago, believed that they were due to perforation of the roof of the external auditory canal in cases where the cellules sometimes extending over this region were the seat of disease. That their origin may be thus explained in some cases I have no doubt, but more frequently they depend on perforation of the membrana flaccida. Subsequently this condition of things attracted the attention of others; several cases came under the observation of Dr. J. O. Green, who, under the head of "An unusual variety of purulent inflammation of the tympanum," described them in the *Boston Medical and Surgical Journal*, March 6, 1874. He regarded the trouble as beginning with a catarrhal inflammation, which afterwards became purulent, and to a greater or less extent involved the entire tympanum—"but the mucus secreted among the ligaments and other structures in the upper part of the tympanum is unable to gravitate to the floor of the cavity on account of its confined position." Both Drs. C. H. Burnett and C. J. Blake reported cases at the meeting of the American Otological Society in 1874. Subsequently the latter drew attention to acute invasions of the upper part of the tympanum (*American Journal of Otology*, April, 1882), observing that the tympanum becomes inflamed during the first few hours, at the furthest in twenty-four hours, and that when the membrana tympani was opened it gave vent to a copious serous discharge. He seems scarcely to have considered the affection as arising altogether independently of the atrium of the tympanum, a view also seemingly accepted by Buck, who states in his book on the ear that purulent matter escapes through the membrana flaccida in acute purulent inflammation of the tympanum, because less resistance is offered in that locality.

Before considering the acute form of inflammation of the attic, as observed by myself, and for some years demonstrated to my students at the New York Eye and Ear Infirmary, I beg to allude briefly to some points concerning the anatomy of that portion of the ear under discussion, which, for the most part, lies immediately beneath a wide triangular plate of bone on the anterior surface of the petrosa, known as the tegmen, consisting of the attic, antrum, a varying number of cellules, and the Eustachian tube. . . .

"The *attic*[1] of the tympanum is a pyramidal recess over the atrium, and above the tympanic orifice of the external auditory meatus. Its upper anterior boundary is the tegmen, which separates it from the cranial cavity, and is mostly provided with a layer of spongy substance of variable thickness. Its inner boundary is a convex prominence (Fig. 1, *e*; Fig 2, *b*), produced by the contiguous portions of the external semicircular and facial canals. Its outer boundary is the wide crescentic tympanic scute (Fig. 1, *b*; Fig. 2, *c*) of the auditory plate. It opens above the prominence of its inner boundary, outward and backward, by a large aperture[2] into the mastoid antrum.

[1] "Atticus tympanicus, upper chamber of the tympanum of Huxley."

[2] "Petro-mastoid canal of Sappey."

Fig. 1.

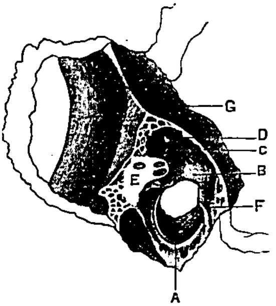


Fig. 2.

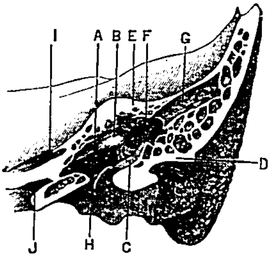


Fig. 1 (Leidy).—View from within of the outer portion of the left temporal bone, sawed through the tympanum, fore and aft, parallel with its inclination. *A*, tympanic margin of the external auditory meatus, formed below and at the sides by the grooved margin of the tympanic plate, and above by the margin of the auditory plate; *B*, scute, forming the outer boundary of the attic: *C*, tegmen; *D*, mastoid antrum; *E*, prominence of the inner posterior boundary of the attic; *F*, canal for the accommodation of the long process of the mallet; *G*, petro-squamosal fissure. Below *E* are seen the pyramid and the aperture of the tympanic cord.

Fig. 2 (Leidy).—Section of the left temporal bone through the squamosa, immediately in advance of the external auditory meatus. *A*, atrium of the tympanum; *B*, prominence on the inner back part of the attic; *C*, scute at the outer part of the attic; *D*, auditory plate; *E*, tegmen; *F*, mastoid antrum; *G*, anterior passage of the same; *H*, canal for the long process of the mallet; *I*, hiatus of the facial canal; *J*, Eustachian tube.

"Beneath, it opens into the atrium by an elliptical aperture, formed internally by the ridge of the facial canal, and externally by the tympanic margin of the auditory plate. . . .

"The *mastoid antrum* (Fig. 1, *d*; Fig. 2, *f*) is a prolongation of the attic backward and outward in the spongy substance of the mastoidea. It is of variable size, ordinarily ranging from that of the attic to double the dimensions of this. It sometimes ends in a blunt, flask-like recess, but is oftener more or less extended downward among the cellules of the mastoid process. Frequently it gives off a smaller fork or passage (Fig. 2, *g*), which is directed outward and upward among the cellules above the external auditory meatus; and rarely a third branch is directed more anteriorly. While the atrium of the tympanum varies but little in size, the attic and mastoid antrum vary greatly."[1]

If now we carefully remove the *tegmen* in the recent subject, and look down upon the parts thus exposed to view, we shall find the attic and antrum *in situ*, and everywhere lined with mucous membrane. The attic is divided by the incus and malleus, which are placed across it fore and aft, into an outer and inner apartment; they only partially occupy it, and the long process of the former and the handle of the latter project down into the *atrium*. The two attic apartments, of which the inner is much the larger, communicate freely with each other overhead, with the atrium below, the Eustachian tube in front, and the antrum behind. The outer apartment is wedge-shaped, wider above and gradually becoming narrower below, where the body of the anvil and neck of the mallet lie almost in contact with the margin of the auditory plate. The bottom communicates anteriorly and posteriorly with the atrium by a very narrow slit.

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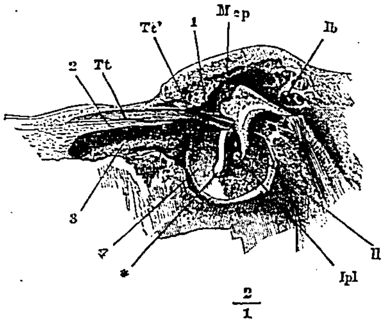
[1] The anatomical description above is from Leidy, *Science*, May and June, 1883.

Fig. 3.



View from within of the right tympanum and contiguous parts. From Henle. *Tt*, *Tt'*, tensor tympani; *Mcp*, head of the hammer; * handle of the same; *Ib*, short, *Il*, long process; *Ipl*, lenticular process of the incus; *I*, chorda tympani; 2, septem tubæ; 3, tube; 4, drumhead.

The inner apartment communicates much more freely with the atrium, but the passage is contracted by the prominence before alluded to on its inner wall, the impingement of the anvil and mallet, and the cord, ligaments, and folds of mucous membrane. (See Fig. 3.)

Acute Inflammation of the Atticus Tympanicus.—This may occur from catarrh of the head, due to exposure or consecutive to the exanthemata, and to the entrance of fluids propelled along the Eustachian tube in bathing or from the use of the nasal douche. It happens very often that the attic only is affected from these causes. This can readily be understood when it is kept in mind that the tympanic orifice of the Eustachian tube opens by a free sweep into the attic as well as into the atrium, and that fluids traversing the canal with considerable momentum would follow the upward sweep of the tympanic embrasure rather than gravitate downward. Moreover, the presence of irritating fluids seems to be much better borne in the lower than in the upper part of the tympanum. Inflammation of the attic may develop consecutively to inflammation of the atrium, and, of course, both may be affected simultaneously.

Inflammation of the attic is a much more serious affair than that of the atrium alone, because of the swelling of the mucous membrane which closes up the outlets and thus prevents drainage.

Inflammation of the attic is usually ushered in by more or less pain. As the disease advances the outlets are more or less closed, and the escape of secretions is thus interfered with. It will generally be found on examining the ear that the membrana flaccida is red, the vascular turgescence extending above on to the external auditory canal, and perhaps downward about the short process of the mallet. In favorable cases the regressive stage may begin at this time, but frequently the inflammation which was thus extended from the bottom of the outer apartment of the attic beneath the margo tympanicus of the auditory plate is attended with effusion of serum or blood; this raises up the membrana flaccida and the adjacent integument of the external auditory canal, which is quite loosely attached to the outer surface of the auditory plate. In some instances the bulging out of these parts is sufficient to form a sac which entirely conceals the membrana tympani, or may even entirely fill the canal and present at the lumen as a purplish tumor. It would seem that in some instances rupture of bloodvessels belonging to the tympanic plexus takes place, giving rise to the sudden extravasation of a large amount of sanguineous fluid. The tumor thus formed does not always communicate with the attic at first, although later on it may do so.

In a certain number of cases of inflammation of the attic, drainage continues through a small perforation in the membrana flaccida, a nipple-like outlet forming which may easily be mistaken for a polypoid growth; indeed, a polypus may subsequently develop from the mucous membrane presenting at this opening.

In a certain number of cases periostitis is present in a marked degree, affecting the neighboring parts; where it extends outwardly, the canal is red and glazed in appearance, but not so much swollen as in the cases above described. The periostitis is liable to spread itself outwardly over the auditory process, and thence along the surface of the mastoid or squamous surfaces of the temporal bone.

Inflammation may also extend downward into the atrium, producing characteristic symptoms in this part of the tympanum.

As long as the membrana tympani and the atrium are unaffected there is comparatively but little deafness, although autophonia may be present.

In nearly all of these cases the inflammatory process in some degree extends inward and backward along the petro-mastoid canal into the antrum; it may advance thence into the mastoid cellules or those lying above the external auditory canal or in the tegmen. When the escape of secretions into the atrium or Eustachian tube is prevented, the case is usually much more severe. It is in these cases that extension to the cranial cavity is most likely to occur. In children the imperfect closure of the petro-squamosal suture affords a much more easy invasion of the cranial cavity, and in adults even this often is a weak point. The antrum may remain in a diseased state after all tympanic trouble has abated, and both the membrana flaccida and membrana tympani have closed, drainage taking place through the Eustachian tube, or by means of a sinus out through the cortex of the mastoid.

The gravity of the case must be determined by the pain experienced and the appearance of the organ—symptoms not always sufficient to establish a differential diagnosis. Pain is often absent where the attic and antrum are affected, whilst in periostitis externa it is frequently severe; its presence, therefore, may in many instances be regarded as rather a question of temperament, at least as regards the tolerance of suffering, than as indicating the extent of the disease. Moreover, it is difficult to distinguish between the pains of middle-ear disease and those of pachymeningitis. As regards the physical signs, when the membrana flaccida and inner superior wall of the canal are red and angry in appearance, whilst there is tenderness over the mastoid or at the attachment of the auricle, we may conclude that the disease is most likely to expend its force externally; if pus makes its appearance early at the membrana flaccida, there is less probability of extension inwards. In young children, or in subjects of ozæna, periostitis externa is liable to be succeeded by caries of the temporal bone which may extend itself down into the antrum. The purulent matter escaping from the attic through the membrana flaccida or from a mastoid sinus in cases of ozæna is characteristic of this disease.

A consideration now of the treatment of inflammation of the middle ear from the writer's point of view need not include the generally accepted methods, but only such as have not, perhaps, been so extensively tried by others. The more serious cases met with occur usually from neglect or maltreatment in persons run down from some cause, and fixed rules for guidance in such cases cannot be made. It is my practice to administer remedies reputed to control inflammatory and purulent action in all cases; relying upon minute doses of mercury in inflammation of mucous surfaces until purulency threatens, when the calx sulphurata is indicated. Pain and vascular excitement may be controlled by aconite, belladonna, pulsatilla, gelsemium, and other remedies. In certain cases much relief may be obtained, or even a cure may result, by removing secretions from the attic through the Eustachian tube, a successful case of which I reported in the *Lancet*, October 18, 1884.

Where the above means, together with the local treatment to be mentioned further on, have been resorted to early, I have never met with a fatal result, and grave symptoms have been much less frequently encountered than when local measures only were employed. In the local treatment where there is simply redness of the membrana flaccida, due to acute catarrhal inflammation, a regressive course is soon established in many cases and any local interference is inadvisable. Where there is periostitis of the canal, incisions often do harm, but where catarrh advances to the purulent stage, the symptoms may become more urgent and the employment of the knife demanded. Unless a sac containing sanguineous matter or pus has formed, and is connected by a sinus with the attic, it will be useless to cut down upon the inner end of the canal or the membrana flaccida, because the knife cannot be thrust through the auditory plate underneath. Vent to secretions in the attic may be assured in some cases by introducing the myringotome through the upper edge of the membrana tympani and behind the long process of the incus. The danger of wounding the chorda tympani nerve is considerable in this operation, and incurrence of the risk would only be justifiable when symptoms were urgent.

When purulent matter forms in periostitis externa, after Wilde's incision drainage can be maintained best by the employment of two or more thicknesses of catgut. This has the advantage of being easily introduced folded end foremost and is not so irritating as most dressings. Where a sinus enters the antrum or cellules, this dressing permits free drainage, and if the number of folds be gradually increased the opening may be enlarged to almost any desired extent. This seems to aid greatly in the disappearance of minute sequestra. The catgut should be changed as often as once or twice daily. I am indebted to Dr. Thomas M. Markoe for the suggestion of the surgical use of catgut.

Where inflammation has extended to the antrum, either from without in consequence of caries due to periostitis externa, or along the petromastoid canal from the tympanum, the surgical aspect of the case may become paramount. From my own experience an extension of the diseased process from the attic is a common occurrence and usually calls for no special interference. But in neglected and otherwise unfavorable cases drainage must be secured whether we have to deal with middle ear disease or any of its complications. Ineffectual operative procedures here needlessly torture the patient without accomplishing the end in view; an operation for the relief of pachymeningitis might thus be tantamount to trephining because of the pains of middle ear disease, a procedure which at best would not probably liberate the products of inflammation of the dura even if any were present. I cannot, therefore, from this point of view, regard trephining the mastoid as other than a means of drainage, not likely to affect the course of pachymeningitis or cerebral abscess.

There is, of course, a wide and honest difference of opinion in respect to the method of securing drainage in purulent middle ear disease, but the writer is constrained to believe that on the whole there is over-much energy manifested in accomplishing this object.

Observation continued since this question was last discussed before this society confirms the belief then held that we may often avail ourselves of the tendency manifested by the pent-up products of inflammation to escape through the posterior wall of the external auditory canal by perforating the posterior edge of the thin auditory plate just above where it joins the tympanic plate. This operation opens up immediate communication with the attic and petro-mastoid canal. In a large number of instances the same object is attained by perforating the membrana flaccida as previously recommended. Efforts must not be omitted in these cases to re-establish drainage from the attic down into the atrium, nor should it be forgotten that a communication with the Eustachian tube very frequently remains in these cases.

In the local treatment of chronic cases where sinuses remain, after the removal of polypi or other products, salicylic acid has, in my hands, been attended with the best results, bringing about a dry desquamative condition, which is often the best issue to be hoped for.

ARTICLE XII.

THE PNEUMONIA-COCCUS OF FRIEDLANDER (*Micrococcus Pasteuri*, Sternberg). SECOND PAPER. By GEORGE M. STERNBERG, M.D., Surgeon U. S. Army.

THE present brief paper becomes necessary, in order to correct an error which occurred with reference to the illustrations of my paper published in the preceding (July) number of this JOURNAL.

Unfortunately the writer was absent in Europe when this paper was published, and failed to receive the proof which was sent to him for correction. This failure has resulted in a grave error through which the amplification of Figs. 1, 2, 3, and 4 is 2500 diameters, while the descriptive text gives it as 1000 diameters. As stated in the last paragraph of the paper, the figures were drawn under the camera lucida with an amplification of 2500 diameters. They were to be reduced by photography to 1000 diameters. *But the reduction was inadvertently not made*, and the comparison of these figures with Fig. 6, in which the amplification is 1000 diameters, shows a very great difference in the dimensions of the oval micrococci from different sources, which might be taken as evidence of a specific difference, instead of specific identity as claimed, if it were not due to a mistake. Moreover, Figs. 5 and 6 are such faulty reproductions that they fail utterly to establish a morphological resemblance to Fig. 7, which is a very good copy of the figure which illustrates the paper of Salvioli. The cuts which have been prepared for the present paper are better, but a comparison of Fig. 5 with the photo-micrograph from which it is copied shows how difficult it is for the wood-engraver to